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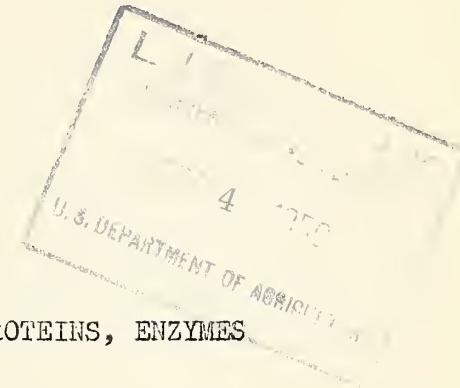
AIC-218
(Supplement No. 4)

LIST OF PUBLICATIONS AND PATENTS WITH ABSTRACTS

Western Regional Research Laboratory
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Contents:

ALFALFA
FOOD PROCESSING
ANTIBIOTICS, VITAMINS, PROTEINS, ENZYMES
PECTIN, SUCROSE HYDRATES
MISCELLANEOUS



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Bureau of Agricultural and Industrial Chemistry
Agricultural Research Administration
UNITED STATES DEPARTMENT OF AGRICULTURE

ALFALFA

AIC-241, ALFALFA--A SELECTED BIBLIOGRAPHY OF ITS COMPOSITION, PROCESSING, AND USE. A. M. Avakian, July, 1949. A bibliography of 555 entries concerned with research on alfalfa, with subject index.

CAROTENE RETENTION IN ALFALFA MEAL; EFFECT OF MOISTURE CONTENT. G. F. Bailey, M. E. Atkins, and E. M. Bickoff, Indus. and Engin. Chem. 41(9):2033-2036, Sept., 1949. In tests on storage of alfalfa meal, the following variables were studied: moisture content (0.5-26.0 percent) and accessibility of atmospheric oxygen. The data suggest that should impervious inexpensive containers become available it would be possible to preserve carotene satisfactorily by air-tight packaging with minimum air space, without resort to unusually high moisture levels or to introduction of inert atmosphere.

DETERMINATION OF BETA-CAROTENE STEREOISOMERS IN ALFALFA. E. M. Bickoff and C. R. Thompson, Jour. Assoc. Offic. Agr. Chem. 32(4):775-780, Nov. 1949. Application of liquid-chromatogram analytical procedure to beta-carotene extracts of dehydrated alfalfa meal has shown that neo-beta-carotene B and neo-beta-carotene U may constitute as much as half the beta-carotene content. Thus analyses that yield only "total carotene" may indicate vitamin A potencies as much as 30 percent higher than those in which allowance is made for reduced nutritional value of these stereoisomers.

STEREOISOMERIC ANALYSIS OF BETA-CAROTENE. E. M. Bickoff, M. E. Atkins, G. F. Bailey, and F. Stitt, Jour. Assoc. Offic. Agr. Chem. 32(4):766-774, Nov., 1949. Variables affecting chromatographic separation of stereoisomers of beta-carotene on hydrated lime columns have been studied. Three fractions consisting of neo-beta-carotene B, all-trans-beta-carotene, and neo-beta-carotene U, are collected and analyzed colorimetrically. The method was applied to analysis of an iodine-isomerized solution of beta-carotene.

FOOD PROCESSING

SULFITE DISAPPEARANCE IN DEHYDRATED VEGETABLES DURING STORAGE. R. R. Legault, C. E. Hendel, W. F. Talburt, and L. B. Rasmussen, Indus. and Engin. Chem. 41 (7):1447-1451, July, 1949. Data obtained on rate of sulfite disappearance from dehydrated sulfited carrot, white potato, and cabbage over a storage-temperature range of 24° to 49°C. have shown that disappearance of sulfite proceeds approximately as a first-order reaction. Rate of disappearance increases with increase in temperature and moisture content of dried products. Nitrogen packing reduces rate as compared with storage in air.

STUDY OF CLARIFICATION METHODS IN THE DETERMINATION OF SUGARS IN WHITE POTATOES. K. T. Williams, E. F. Potter, A. Bevenue, and W. R. Scurzi, Jour. Assoc. Offic. Agr. Chem. 32(4):698-706, Nov., 1949. In analyses of white potatoes for sugar, varied results were obtained by different methods of analysis when lead acetate-carbon clarification was used to remove non-sugar-reducing materials. Ion-exchange resins removed non-sugar-reducing substances and concordant results were obtained by the four methods of analysis studied.

AIC-246, PRE-PEELED POTATOES FOR COMMERCIAL USE. R. L. Olson (WRRL) and R. H. Treadway (Eastern Regional Research Laboratory), Aug., 1949. A short introduction and discussion of origin and history are followed by description of unit processes involved in pre-peeling of potatoes. A review of some pertinent patents and a selected bibliography on peeling methods for potatoes are included as appendices.

TREATMENT OF FRUITS TO PREVENT BROWNING. Patent No. 2,475,838 to G. Johnson and D. G. Guadagni, patented July 12, 1949. Fruits, such as peaches or apricots, are dipped in an aqueous solution containing salt, ascorbic acid, and sodium bisulphite prior to freezing. By this method browning of the fruit is prevented.

PROCESS FOR PASTEURIZATION AND ENZYME INACTIVITY OF FRUITS BY ELECTRONIC HEATING. Patent No. 2,476,251 to T. L. Swenson, patented July 12, 1949. Orange juice is prepared by subjecting whole oranges to a high-frequency electrostatic field to pasteurize the juice and inactivate its enzyme content. The treated oranges are then cooled and the juice expressed therefrom.

AIC-253, SIRUP TREATMENT OF APPLE SLICES FOR FREEZING PRESERVATION. Anon., Sept., 1949. Vacuum impregnation of apple slices with sugar sirups has been studied and the product has been compared with that from steam blanching and from sulfiting. Generally the product of sirup filling was equal or superior, but most improvement over other processes was noted in the softer varieties.

TREATMENT OF APPLE SLICES FOR FREEZING PRESERVATION. D. G. Guadagni, Food Tech. 3(12):404-408, Dec., 1949. Vacuum impregnation of apple slices with sugar sirups has been studied and the product of this prefreeze treatment has been compared with that from steam blanching and from sulfiting. Generally the product of sirup filling was equal or superior, but most improvement over other processes was noted in softer varieties. (Same process as described in AIC-253.)

ENZYMIC OXIDATION OF PHENOLIC COMPOUNDS IN FROZEN PEACHES. D. G. Guadagni, D. G. Sorber, and J. S. Wilbur, Food Tech. 3(11):359-364, Nov., 1949. Methods are presented for quantitative estimation of rate and extent of enzymatic browning in frozen peaches. Degree of browning in several peach varieties was found to be directly related to the amounts of oxidizable tannins present.

PROCESS FOR PRESERVING FOODS. Patent No. 2,477,605 to L. B. Howard, W. D. Ramage, and C. L. Rasmussen, patented Aug. 2, 1949. Relates to the "dehydro-freezing" process for preserving foods wherein the food is first partially dehydrated and then frozen.

QUALITY RETENTION THROUGH DEHYDROFREEZING. R. R. Legault and W. F. Talburt, Refrig. Engin. 57(12):1175-1177, Dec., 1949. A general description of investigations in the field of dehydrofreezing of fruits and vegetables in the Western Regional Research Laboratory, including recent extensive research on peas and apples.

WESTERN LABORATORY PLANS TESTS TO FIND NEW FOOD USES FOR RICE. E. B. Kester, Rice Jour. 52(7):16, July, 1949. A description of research on rice at the Western Regional Research Laboratory, including stabilization of brown rice by solvent extraction and steam blanching of rice.

STEAM BLANCHING OF FRESH ROUGH RICE CURBS SPOILAGE BY FATTY ACIDS. R. L. Roberts, G. R. Van Atta, I. R. Hunter, D. F. Houston, E. B. Kester, and H. S. Olcott, Food Indus. 21(8):1041, Aug., 1949. Lipase activity in rice is inhibited by steam blanching undried rough rice for periods as short as one minute. This treatment results in stabilization of oil in rice bran (or brown rice) against fatty acid development, and allows recovery of high-grade edible oil.

MUSHROOM MYCELIUM PRODUCTION BY SUBMERGED PROPAGATION. H. Humfeld and T. F. Sugihara, Food Tech. 3(11):355-356, Nov., 1949. A process for production of mycelium of the commercially grown mushroom, Agaricus campestris, by submerged propagation is described. Mycelium with good mushroom flavor and with hardly any flavor can be produced under variable conditions. The composition of the product, as compared with fresh mushroom, and its potential uses are discussed.

AN IMPROVED HEATED-THERMOCOUPLE ANEMOMETER FOR USE IN AIR-BLAST FREEZERS. E. Lowe and J. R. Hawes, Food Tech. 3(7):241-243, July, 1949. An improvement for a heated-thermocouple anemometer was developed for use in measuring air velocity in air-blast freezers. A method was devised for adjusting calibration of each individual anenometer to fit a common calibration curve, making possible the use of several anenometers interchangeably.

A DEFROSTING INDICATOR FOR FROZEN FOODS. A. A. Andersen, Food Tech. 3(11):357-358, Nov., 1949. A new defrosting indicator for frozen foods is described. Its action depends on the melting of a compound containing a red dye, and diffusion of the compound along a strip of filter paper as the package defrosts. At about the time of complete defrosting the red color reaches a visible position. The indicator can be adjusted to react at lower temperatures. The device is simple in design, flexible, practical in application, and inexpensive to manufacture.

*SUBJECTIVE ESTIMATION OF PALATABILITY DIFFERENCES IN FOODS BY LABORATORY PANELS. M. M. Boggs and H. L. Hanson, Advances in Food Research, Vol. 2, pp. 219-258, 1949. The literature on subjective estimation of food quality designed to show differences in palatability is reviewed and evaluated. Methods used to determine differences are described; and factors that affect reliability of subjective evaluation are considered. Examples are given of the application to two commodity groups of controlled methods of appraisal. Objective measurements of quality are considered as a supplement to subjective methods.

ANTIBIOTICS, VITAMINS, PROTEINS, ENZYMES

ESTERIFICATION OF SUBTILIN AND ITS EFFECT ON SOLUBILITY AND IN VITRO BACTERIOSTATIC ACTIVITY. J. F. Carson, E. F. Jansen, and J. C. Lewis, Jour. Amer. Chem. Soc. 71(7):2318-2322, July, 1949. Methyl esters and hydroxyethyl esters have been prepared that have unimpaired bacteriostatic potency and greatly enhanced solubility (30- to 40-fold) over that of the parent compound. Ethyl esters and hydroxypropyl esters had decreased bacteriostatic potencies and only slightly increased solubilities.

ABSORPTION OF SUBTILIN IN THE RABBIT. R. H. Wilson, E. M. Humphreys, D. M. Reynolds, and J. C. Lewis, Proc. Soc. Expt. Biol. and Med. 71(4):700-705, Aug., 1949. Subtilin, a subtilin-pectin complex, and two methyl esters of subtilin have been administered to rabbits in a variety of ways, and blood samples have been assayed to determine amount absorbed. A slow intravenous infusion was the only satisfactory method of maintaining substantial levels of subtilin in the blood.

PURIFICATION OF SUBTILIN. Patent No. 2,476,085 to W. P. Dimick, J. J. Stubbs, J. A. Garibaldi, H. D. Lightbody, and H. L. Fevold, patented July 12, 1949. The antibiotic, subtilin, is isolated from cultures of Bacillus subtilis by extraction with butanol.

LUPULON AND HUMULON--ANTIBIOTIC CONSTITUENTS OF HOPS. J. C. Lewis, G. Alderton, J. F. Carson, D. M. Reynolds, and W. D. Maclay, Jour. Clin. Invest. 28(5):pt. 1, 916-919, Sept., 1949. The activity of lupulon and humulon, antibiotic constituents of hops, is reviewed and methods for large-scale isolation are discussed. The substances are found to be active primarily against Gram-positive and acid-fast bacteria in concentrations ranging from 1 to 10 ppm. for lupulon and 10 to 100 ppm. for humulon.

TECHNIQUE FOR ISOLATING SUBTILIN. Patent No. 2,481,763 to H. Lineweaver, A. A. Klose, and G. Alderton, patented Sept. 13, 1949. Subtilin is isolated from cultures of B. subtilis by extraction with butanol, followed by addition of salt to the butanol extract to precipitate the subtilin.

PROTECTION OF LUPULON AND HUMULON BY ASCORBIC ACID. H. D. Michener and A. A. Andersen, Science 110(2846):68-69, July 15, 1949. The antibiotic activity of lupulon in dilute aqueous solutions was found to be protected by ascorbic acid during heat sterilization. In bacterial cultures, ascorbic acid protected lupulon and humulon and extended the duration of their activity.

AIC-254, FERMENTATION PROCESS FOR PRODUCTION OF VITAMIN B₁₂. J. C. Lewis, K. Ijichi, N. Snell, and J. A. Garibaldi, Oct., 1949. Describes a strain of Bacillus nefatherium and cultural conditions under which a vitamin B₁₂ yield of 0.6 mg. per liter of whole culture can be obtained. The synthetic medium contains sucrose, a trace of citric acid, ammonia as source of nitrogen, and inorganic salts.

THE "BROWNING" REACTION OF PROTEINS WITH GLUCOSE. A. Mohammad, H. Fraenkel-Conrat, and H. S. Olcott, Arch. Biochem. 24(1):157-178, Nov., 1949. Investigations of changes taking place when proteins and reducing sugars are in contact are reported. Some of the undesirable changes that take place in food products on storage are the result of the same or similar reactions.

THE REACTION OF PROTEINS WITH ACETALDEHYDE. A. Mohammad, H. S. Olcott, and H. Fraenkel-Conrat, Arch. Biochem. 24(2):270-280, Dec., 1949. Treatment of proteins with acetaldehyde at neutrality and room temperature causes browning within a few hours. Rate of browning with acetaldehyde is about 35 times as fast as that observed with glucose under comparable conditions. Chemical group involved were studied and are discussed.

PHOSVITIN, THE PRINCIPAL PHOSPHOPROTEIN OF EGG YOLK. D. K. Mechan and H. S. Olcott, Jour. Amer. Chem. Soc. 71(11):3670-3679, Nov., 1949. Phosvitin, a new phosphoprotein that contains about 10 percent of phosphorus, has been obtained from egg yolk by several procedures. Studies have demonstrated that 60 to 70 percent of the phosphorus of yolk is present in this protein fraction. It constitutes about 5 percent of the total protein of egg yolk.

ISOLATION OF POLYGALACTURONASE. Patent No. 2,479,751 to H. Lineweaver, R. Jang and E. F. Jansen, patented Aug. 23, 1949. The enzyme, polygalacturonase, is isolated from commercial pectinase preparations by a process which includes adsorption of the enzyme on alginic acid.

PECTIN, SUCROSE HYDRATES

PERMEABILITY OF PECTINATE FILMS TO WATER VAPOR. T. H. Schultz, J. C. Miers, H. S. Owens, and W. D. Maclay, Jour. Phys. and Colloid Chem. 53(9):1320-1330, Dec., 1949. Transmission rates for permeation of water vapor through pectinate films, 40 microns thick, vary from 1700 to 4500 g. per sq. meter per day at 25°C. and with a relative humidity differential of 81 to 31 percent. These values are of the same order of magnitude as data on plain cellulose and films of other carbohydrate derivatives. Transmission rates for pectinate films have been decreased to as low as 1.4 g. per sq. meter per day by supplementary wax coatings.

LOW-METHOXYL PECTINS AND PROCESS FOR THEIR PREPARATION. Patent No. 2,478,170 to W. D. Maclay and R. M. McClealy, patented Aug. 9, 1949. Low-methoxyl pectins are prepared by alkaline de-esterification of pectin employing controlled conditions, i.e., pH 10-12, temperature 12°-15°C.

SUCROSE HYDRATES; THE SUCROSE-WATER PHASE DIAGRAM. F. E. Young and F. T. Jones, Jour. Phys. and Colloid Chem. 53(9):1334-1350, Dec., 1949. The sucrose-water system has been investigated by warming curves, solubility measurements, and microscopy. Two crystalline hydrates of sucrose have been isolated and identified as sucrose henipentahydrate ($C_{12}H_{22}O_{11} \cdot 2\frac{1}{2}H_2O$) and sucrose hemihepta-hydrate ($C_{12}H_{22}O_{11} \cdot 3\frac{1}{2}H_2O$). Two additional solid phases have been isolated and indications of several more have been obtained.

MISCELLANEOUS

PHENOTHIAZINE DERIVATIVES: MONO-OXYGENATED COMPOUNDS. D. F. Houston, E. B. Kester, and F. DeEds, Jour. Amer. Chem. Soc. 71(11):3816-3818, Nov., 1949. A series of simple alkyl ethers (isopropyl, octyl, dodecyl, and hexadecyl) of phenothiazine-3 prepared by sulfur fusion of corresponding alkoxy-diphenylamines, is described. Spectral absorption data, analyses, and melting points are recorded.

PHENOTHIAZINE DERIVATIVES: DIOXYGENATED COMPOUNDS. D. F. Houston, E. B. Kester, and F. DeEds, Jour. Amer. Chem. Soc. 71(11):3819-3822, Nov., 1949. An improved preparation of thionol is described. Alkyl ethers, including ethyl, n-amyl, octyl, dodecyl, and hexadecyl ethers, are made by treating the silver salt of the parent substance with appropriate alkyl iodides. Spectral absorption data and other physical properties of the compounds are recorded. The compounds have improved lipid solubility over thionol and retain its oxidation-reduction characteristics.